

NOTES ON CYNIPID WASPS, WITH DESCRIPTIONS OF NEW NORTH AMERICAN SPECIES.

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The present paper contains some miscellaneous notes on several species of both parasitic and gall-inhabiting Cynipidae, including some on synonymy and some generic transfers made as the result of a study of the Bassett and Osten Sacken types in the light of the Dalla Torre and Kieffer Monograph of 1910¹ and a study of the genotypes of the Ashmeadean genera.

In the course of a visit to Philadelphia and Cambridge in May, 1921, the writer saw several species belonging in the genus *Callirhytis* and related to certain species reared from acorn galls on which he was preparing another paper. An attempt was made to bring these related species all together in a key, and where sufficient material and biological data was available a few new species in this section of the genus are here described preliminary to a later paper.

The American fauna is peculiar in having several genera of apterous and subapterous forms which are no doubt the agamic generations of other genera. Few life histories have been worked out, however, and for the present it seems best to group these species as best we can into these genera. From a study of the genotypes two of these genera are here synonymized. On the other hand, two others, long united in literature, are here recognized as valid after a study of all the species in the light of a reëxamination of the genotypes. This separation received biological confirmation in the fact that the galls of the two genera are of quite different types. Tentative keys are given for the determination of the adults and a new species is described in each genus. Whether these generic names will continue to be applied to these species groups when the life history and alternating generation of each species is known is not of present concern.

The paper is prepared under the general direction of Mr. S. A. Rohwer, custodian of Hymenoptera in the United States National Museum, where types of the five new species are deposited.

¹ Dalla Torre and Kieffer, Das Tierreich, Lief. 24, 1910.

IBALIA MACULIPENNIS Haldeman.

Plate 1.

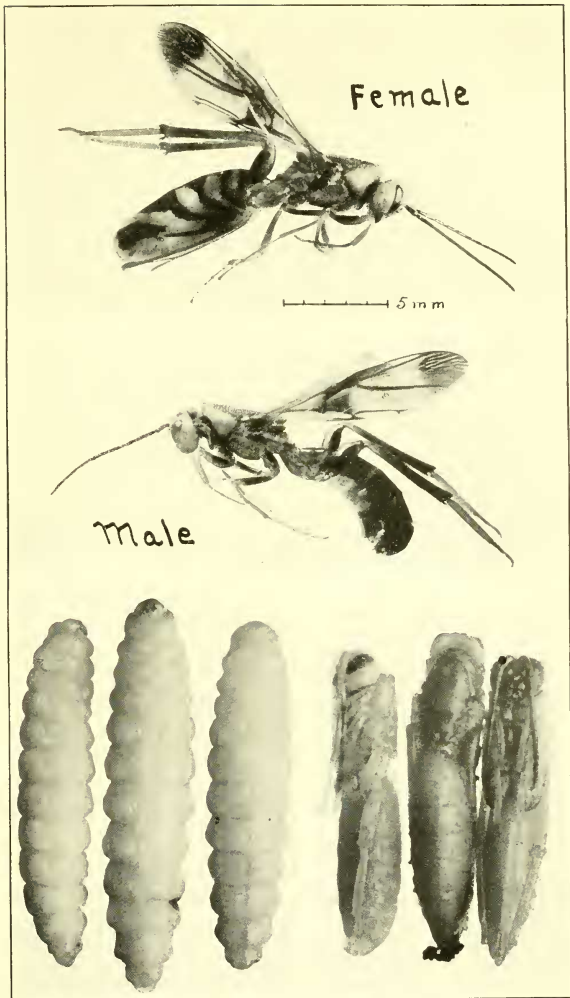
Ibalia maculipennis HALDEMAN, Proc. Acad. Nat. Sci. Phila., vol. 3, 1846, p. 127.

Ibalia fasciipennis KIEFFER, Bull. Soc. Hist. Nat. Metz, vol. 26, 1909, p. 57.

Kieffer's *fasciipennis* was described from a single female from Wilmerding, Pennsylvania, collected by C. F. Baker, and the type was returned to Professor Baker, at Pomona College, where the writer has studied it and compared it with *maculipennis* and was not able to find any character to separate them. There appears to be but the one species in the deciduous forest area of the northeastern United States, and the writer concludes that *fasciipennis* is a synonym of *maculipennis*, which was also described from Pennsylvania. Haldeman's type of *maculipennis* is preserved in the Geneva Museum, and W. A. Schulz published a redescription of the species in 1912.²

The following notes record the writer's observations on this species: Five miles west of Evanston, Illinois, near the north branch of the Chicago River there stands on deep, rich, black loam an area of heavy forest of basswood, soft maple, ash, and elm, with considerable undergrowth. In this area of a few acres there were many standing dead hickory trees killed by bark beetles previous to 1913. On June 22, 1913, an insect was taken ovipositing in one of these dead trees and recognized as belonging to this species. The next day a search was made for more and 25 were taken and the next day 50 more and 6 males and three days later 23 females and 2 males. On June 16, 1916, the trees were visited again and 10 females and 31 males taken; on July 4, 1917, 10 females and 1 male, and six days later 13 females; on June 12, 1919, found 11 females and 1 male, three days later 20 females and 7 males, three days later 2 females and 3 males, and on June 26, 4 females. A total of 221 females and 164 males were taken from this single locality during a period of seven years. These males and females probably occur in equal numbers, but the males are harder to capture. They are seen sunning themselves on the trunks of the dead trees, but are easily disturbed and fly to surrounding vegetation, from which they soon return. The females when ovipositing can all be picked off by hand at the first visit to the tree. Both are usually found within easy reach from the ground, and the majority of females oviposit within 2 feet of ground, where underbrush shades the base of the tree and the process of decay has reached a certain stage. As many as 23 have been taken on one tree at a single visit.

² Societas Entomologica, vol. 27, pp. 109-110.



IBALIA MACULIPENNIS HALDEMAN. FEMALE, MALE, LARVAE, PUPAE

FOR DESCRIPTION OF PLATE SEE PAGE 2.

The ovipositor is from 25 to 28 mm. long and midway of its length about 0.052 mm. in diameter. The knife-like abdomen is thrust deeply into a crack in the outer bark and several attempts were made by clipping off the ovipositor and then boring a series of holes around the area and removing the block of wood to trace the further course of the ovipositor into the wood. It does not seem to be driven into the solid wood, but into a hole probably made by a horntail the midsummer before and which has become plugged up by a growth of sterile mycelium. When the horntail egg hatches the horntail larva eats a straight course toward the center of the tree, and one which had penetrated 3-5 mm. into the wood measured 1.2 mm. in length. As they advance, they molt frequently, and four or five cast larval skins were found in the first inch. The passage gradually enlarges as it goes deeper and the older parts become plugged with fungus. It is into this plug that the *Ibalia* ovipositor is thrust, and when the egg hatches the larva probably crawls along until it overtakes the horntail larva. How large the horntail larva has become and how far it has penetrated into the wood when attached is not known. Trees were visited about the middle of March one spring and nine horntail larvae were found about 50 mm. deep in the wood, measuring 6.5-10.5 mm. long and evidently from eggs laid the previous season. Seven *Ibalia* larvae were also found, 13.8-20 mm. long, apparently full grown, not near a horntail larva in any case, but in burrows they had evidently made for themselves. In similar burrows *Ibalia* pupae were found in June. Perhaps they make these burrows after they finish feeding. After transformation each *Ibalia* chews a hole through the wood and back to the exterior. The exit holes measure 3.0-3.4 mm. in diameter. The males begin to issue first. The earliest date of capture recorded on museum labels is June 1 in Pennsylvania and the latest is July 21 in Maine, the majority being taken in June.

The above series of specimens is probably the largest of any species of *Ibalia* or any other parasitic Cynipid ever studied, and measurements were made of the fresh specimens to the nearest tenth of a millimeter by optical methods. This series is supplemented by measurements of about 80 museum specimens, making a total of 480-280 females and 200 males.

Few studies of the variability of a parasitic insect are known to the writer. The above series seems sufficiently numerous to be representative of the species, so that it seems worth while to put on record the information that a study of the frequency distribution curve may yield regarding type and variation from it. Some individuals vary but little from the prevailing type, others more, and others still more. The following attempt to measure and record

this nonconformity to type will be of most interest when it is possible to compare it with similar studies made on parasitic insects in other groups. This deviation is not so much to be regarded as a failure of heredity or a wandering from a fixed standard as a normal tendency of a species to vary, and of this inherent tendency biologists and systematists must take account. Some species may vary more than others, and by the use of the statistical method it is possible to derive and record considerable information concerning a species, information of a very different character from that usually given in descriptions and yet quite as fundamental as color, vestiture, or sculpture. The purpose of systematic entomology is to classify insects into groups of individuals known as species. But the present tendency is to describe the type specimen (an individual) implying that this description will fit other individuals of the group, then sometimes telling how the paratypes differ from the type and calling the result a description of a *species*, without mention of any species characteristics, such as range in size or any measures of prevailing type or variability, qualities which belong to the group as a whole and might serve to distinguish it from other related groups. The biometrical constants and frequency distribution curve are constant for the species and have the advantage of not being expressed in terms of any individual in the group.

In the accompanying graphs (fig. 1) the full line (for females) and the long and short dotted line (for males) represents the original data on the frequency distribution of the sizes of males and females plotted as ordinates, the measurements being grouped into half-millimeter classes and the abscissas taken from the mid-point of each class. By mathematical methods these ordinates have been graduated and the resulting smoothed curves represented by dotted (for females) and crossed (for males) lines. The computed constants are as follows:

	Males.	Females.
Range.....	9.2-15.7 mm...	9.2-17.0 mm.
Mode.....	13.25 mm.....	14.5 mm.
Median.....	13.195 mm.....	14.398 mm.
Mean.....	13.09 mm.....	14.239 mm.
Probable error of mean.....	±.047 mm.....	±.056 mm.
Standard deviation.....	.984 mm.....	1.393 mm.
Probable error of standard deviation.....	±.033 mm.....	±.040 mm.
Coefficient of variability.....	7.52%.....	9.78%.
Probable error of coefficient of variability.....	±.25%.....	±.28%.

It will be seen that by any measure of prevailing type, the mode, median or mean, the females are somewhat larger than the males. The variability of the females is greater also. It is no greater, however, than that found in a gall-forming species³ studied by the

³ Canad. Ent., vol. 51, 1919, pp. 254-5.

author. The tendency toward dwarfism in *Ibalia* must be considered, therefore, not as due to lack of food, but an expression of a normal tendency in the species to depart from the type. The best

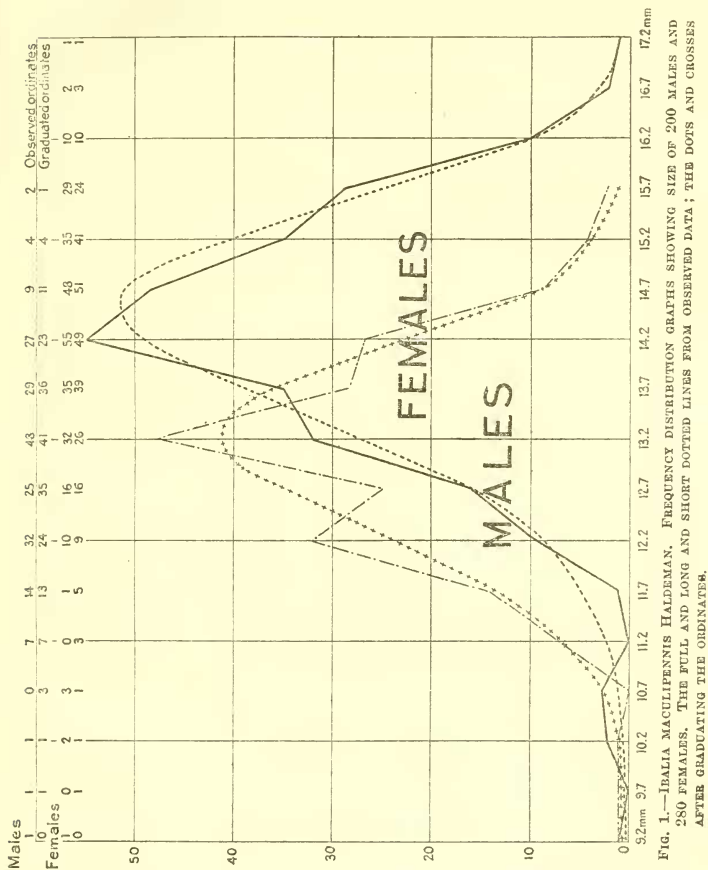


FIG. 1.—*IBALIA MACULIPENNIS* HALDEAN. FREQUENCY DISTRIBUTION GRAPHS SHOWING SIZE OF 200 MALES AND 280 FEMALES. THE FULL AND LONG AND SHORT DOTTED LINES FROM OBSERVED DATA; THE DOTS AND CROSSES AFTER GRADUATING THE ORDINATE.

measure of this variability is the standard deviation which defined the shape of the frequency curve much as the radius defines a circle.

LIOPTERON TARSALE Ashmead.

The Academy of Natural Sciences, Philadelphia, has one female determined by the writer as this species by comparison with Ash-

mead's type. It is from Mexico, a locality from which the genus has not previously been recorded.

ANACHARIS LAMYI Cockerell.

Anacharis mexicana ASHMEAD (not *Megapelmus Mexicannus* Cameron 1884=*Anacharis mexicana* Cameron), Trans. Amer. Ent. Soc., vol. 23, 1896, p. 184.

Anacharis lamyi COCKERELL, Trans. Kansas Acad. Sci., vol. 16, 1899, p. 213.

Anacharis ashmeadi DALLA TORRE and KIEFFER in WYTSMAN Gen. Ins. Cynipidae, 1902, p. 14.

Not knowing that Cockerell had already changed the name of Ashmead's species, Dalla Torre and Kieffer in 1902 have erroneously given it the name of *ashmeadi*, which cannot stand.

LONCHIDIA HIRTA Provancher.

When studying the Provancher material in the collections at Quebec in 1915 in order to select lectotypes, Messrs. Gahan and Rohwer were unable to locate the type of this species. The only material the writer has ever seen determined as this species is a specimen in the United States National Museum bearing the label "Ontario," and a yellow label with the number "39," evidently sent out of the first collection by Provancher to Ashmead and labeled in Ashmead's hand "*Lonchidia hirta* Prov." The species was described from a female from Cap Rouge, Ontario. This specimen can be but a Provancher determination, and yet it is the most authentic material of the species known to be extant, so that it seems best to choose it as a lectotype. The size and shape of the radial cell agrees so closely with Dahlbom's figure of the wing of the genotype that *hirta* is left in *Lonchidia* in spite of the closed radial cell.

COTHONASPIS (ADIERIS) FLORIDANA (Ashmead).

Piezobria floridana ASHMEAD, Trans. Amer. Ent. Soc., vol. 23, 1896, p. 185.

In the Dalla Torre and Kieffer key (1910) the types of this species run to *Cothonaspis* (*Adieris*).

PSILODORA VAGABUNDA (Ashmead).

Kleidotoma vagabunda ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, 1885, pp. 298, 302.

Having a hairy ring at base of abdomen, the fore wing naked and nonciliate, the radial cell closed, and the disk of scutellum rounded behind, the type of this species goes in *Psilodora* rather than in *Erisphagia*, where Das Tierreich puts it.

DIPLOLEPIS BREVIPENNATA (Gillette).

Holcaspis brevipennata GILLETTE, Ent. News, vol. 4, 1893, p. 31.

Andricus pellucidus KINSEY, Bull. Amer. Mus. Nat. Hist., vol. 42, 1920, pp. 300-10, 384, pl. 23, figs. 19-21.

The type of *brevipennata* in the American Museum belongs in *Diplolepis* of the Dalla Torre and Kieffer monograph of 1910. It has the second tergite prolonged, the carina on propodeum angled, a transverse groove at base of scutellum, complete parapsidal grooves, and claws with a tooth. It goes in that section of the genus with spotted wings and is unique in having the wings reduced in size although not shorter than the abdomen, as maintained in the original description. The abdomen reaches two-thirds of the distance from the tip of radial cell to apex of wing, so the wing reaches slightly beyond tip of abdomen. The areolet is incomplete. The type locality Manitou, Colorado.

A. pellucidus was described from a similar gall from practically the same locality. The writer has seen cotypes kindly loaned by Doctor Kinsey and others in the Museum of Comparative Zoology and has been unable to separate them from *brevipennata*.

The United States National Museum has one specimen (Hopkins, U. S. No. 10781¹) from Garden of the Gods, Colorado Springs, Colorado, reared November 20, 1918, which the writer has determined as this species. It issued normally and is in better condition than any of the above-mentioned type material. Its abdomen reaches to largest spot in apical area. The writer has one specimen cut alive out of a gall on November 9, 1917, the galls being collected on November 4. The writer has collected what seemed to be the galls of this species at Manitou, Trinidad, and Morley, Colorado; Las Vegas, Sandia Mountains, and Fierro, New Mexico; Williams and Prescott, Arizona; and Alpine, Texas.

DIPLOLEPIS SPLENDENS (Weld).

Andricus splendens WELD, Canad. Ent., vol. 51, 1919, pp. 254-5.

This species should be transferred to the genus *Diplolepis*.

DRYOCOSMUS FASCIATUS (Bassett).

Holcaspis fasciata BASSETT, Trans. Amer. Ent. Soc., vol. 26, 1900, p. 328.

This species has not at all the habitus of a *Disholcaspis*, the meso-scutum being bare, smooth, and shining, the parapsidal grooves complete, and the claws simple. It seems to belong in the genus *Dryocosmus*.

XYSTOTERAS POCULUM, new species.

Female.—Black. Head from above broader than thorax; length in median line half width, scarcely widened behind eyes; from in front

as long as broad, interocular space 0.55 transfacial, and area higher than broad; malar space one-fourth eye; antennae 14-segmented; lengths as (pedicel) 12:9:14:11:9:9:8:8:8:7:7:6:6:8; palpi 5 and 3 segmented; the basal maxillary and middle labial segments very short; sides of pronotum and mesopleurae smooth. Mesoscutum smooth and shining with about 25 scattered hairs on parapsides; parapsidal grooves absent or faint in middle and obliterated at each end. Scutellum disk smooth, rounded behind, clothed with sparse hairs; base with narrow transverse groove without pits. Propodeum slightly rugose in place of usual carinae. Wings not reaching abdomen. Hind tarsus longer than tibia; claws with weak tooth at base. Abdomen longer than head and thorax, in side view longer than high, compressed to less than width of thorax; the second tergite longest, occupying 0.28 of the length of abdomen; the others all visible and gradually decreasing in length; ventral valves oblique, but not protruding; ventral spine in side view six times as long as broad. Ovipositor hooked at end. Using width of head as a base, the length of mesonotum ratio is 0.75; antenna, 2.04; ovipositor, 5.8; wing, 0.5.

Length of 36 pinned specimens, 1.5–2.3 mm.; average 1.9 mm.

This species is closely related to *Acraspis politus* Bassett, which is a *Xystoteras*.

Type.—Cat. No. 24732, U.S.N.M. Thirty cotypes.

Host.—*Quercus alba*.

Galls.—Popularly known as “spangle” galls and first described by Fitch in 1859, these common objects have an extended literature under the name of *Cecidomyia poculum*, with good figures by Glover, Beutenmueller, Stewart, Thompson, and Felt, but they have not hitherto been reared. Osten Sacken suspected that they were due to a Cynipid.

The galls are attached in groups on the underside of mature leaves, and they are found in September and October. They are button-shaped, 3–4.5 mm. in diameter, covered with a whitish bloom, slightly concave above, with a low elevation in center, the edge sharp and becoming less upturned as the larval cavity develops, attached by a short slender pedicel, between which and the rim on the under side is a prominent heavy rounded ring of tissue. The larval cavity is centrally placed, transverse, with no false chamber.

Habitat.—The type material was collected at Ironton, Missouri, on October 5, 1917, and living flies were found in the out-of-door breeding cage at Evanston, Illinois, on March 24, 1919, indicating that the emergence is very early the second spring. This delayed emergence probably accounts for the failure of other students to rear it.

The writer has seen these galls in Virginia, New York, and Illinois also and museum specimens from Vermont and New Hampshire, indicating a widespread distribution of the species.

There is a precisely similar gall in *Q. prinus*, which will no doubt prove to be due to this species.

Genus ZOPHEROTERAS Ashmead.

Zopheroterus ASHMEAD, Canad. Ent., vol. 29, 1897, p. 261. Genotype.—*Acraspis vaccinii* Ashmead.

Parateras ASHMEAD, Canad. Ent., vol. 29, 1897, p. 262. Genotype.—*Parateras hubbardi* Ashmead.

Parateras hubbardi Ashmead was described from two specimens from Detroit, "nothing known regarding habits." One of these is in the United States National Museum. Its hind tarsi are shorter (not longer) than their tibiae in the proportion of 50:59, and the tarsal claws are simple (not toothed). In both respects it does not differ from the type of *vaccinii*. In *vaccinii* the third joint of the antenna was said to be "as long or nearly as long as joints 4 and 5 united," but a balsam mount shows the length of the first seven segments to be as 13:8:19:13:11:10:9, so that the third is distinctly shorter than 4 plus 5, and in this respect it does not differ from *hubbardi*. Both have the same type of scutellum, the second tergite occupying slightly over six-tenths of abdomen, the same type of ventral spine, the head not broadened behind the eyes, malar space less than half eye, the parapsidal grooves strongly converging behind, and both are entirely wingless. Therefore *hubbardi* seems to be congeneric with *vaccinii* and *Parateras* a synonym of *Zopheroterus*.

The species *vaccinii* was described from a "huckleberry-like" gall in clusters on midrib of post oak, dropping to ground in fall, and the type galls answer this description. They are evidently galls of a winged species which Beutenmueller has described as *Andricus impositus*. In picking up galls Ashmead evidently picked up a few of a different sort, from which he reared two wingless flies, which he called *vaccinii*, and associated them with the wrong gall. The gall of this *Zopheroterus* is then still undescribed.

The gall of *hubbardi* is still unknown. The writer has seen one fly which he has determined as that species by comparison with the type from Bladensburg, Maryland, captured April 8, 1915, by L. O. Jackson, and another from Bellmore, Long Island, collected by G. P. Englehardt.

Dalla Torre and Kieffer are apparently in error in making *Zopheroterus* a synonym of *Trigonaspis*. It does not seem at all related to the European wingless form, *Trigonaspis megaptera* (Panzer).

NOTES ON PHILONIX FITCH AND ACRASPIS MAYR.

The genus *Philonix* Fitch was proposed in 1859 for two apterous species of Cynipidae, *fulvicollis* Fitch ⁴ and *nigricollis* Fitch, captured on snow. Ashmead ⁵ subsequently designated *fulvicollis* as the type, and Dalla Torre and Kieffer ⁶ placed the genotype in *Biorhiza*. A study of Fitch's type of *fulvicollis* in the United States National Museum shows a scutellum which is normally rounded behind and a very peculiar spine broadest at its truncated posterior end, which is armed with long bristles. No flies reared from a known gall are at hand which agree with this specimen, so the gall of this species is yet to be discovered. Fitch thought it was from a root gall, but more likely it is from a deciduous gall on a leaf. The illustration showing these characters is from a balsam mount of a congeneric new species here described.

The genus *Acraspis* Mayr ⁷ was proposed in 1881 for two American species which he no doubt had before him, "*pezomachoides* Osten Sacken and *erinacei* Walsh" and which he did not separate by any mentioned characters. The former species, whose gall had long been known in literature under the name of *Cynips pisum*, was reared in 1862 and described as *Cynips pezomachoides* Osten Sacken. The latter was a *nomen nudum* for the gall only for the fly was not described at the time Mayr wrote, although he no doubt considered it as a valid Ashmead synonymized *Acraspis* with *Philonix*, and Beutenmueller ⁸ Osten Sacken as the type of *Acraspis*. In 1897, and again in 1903, Ashmead synonymized *Acraspis* with *Philonix*, and Beutenmueller ⁸ and other authors have followed him. In *pezomachoides*, however, the scutellum is triangular, distinctly pointed behind, and the ventral spine, while broader and shorter than in most genera of the oak-gall makers, is rounded behind and very hairy, not truncate with the very long bristles of *Philonix*. These seem to be sufficiently good generic characters to warrant the separation of these genera which Ashmead united. When the described species of these two genera were studied with these characters in mind, it was found that *fulvicollis* Fitch, *nigricollis* Fitch, *lanæglobuli* Ashmead, and *nigra* (Gillette) (= *gillettei* Bassett) belong in *Philonix*, while *pezomachoides* (Osten Sacken), *villosa* Gillette, *macrocarpae* Bassett (= *undulata* Gillette), *hirta* (Bassett), *echini* Ashmead, *erinacei* Beutenmueller, and *prinoides* Beutenmueller belong in *Acraspis*.

This arrangement receives biological confirmation in the fact that the galls of all the species of *Acraspis* are all of the same general

⁴ Fifth Rept. Nox. Ins. N. Y., 1859, p. 783.

⁵ Psyche, vol. 10, 1903, p. 148.

⁶ Das Tierreich, Lief. 24, 1910, p. 402.

⁷ Genera gallenbew. Cynip, 1881, pp. 2, 29.

⁸ Bull. Amer. Mus. Nat. Hist., vol. 26, 1909, p. 246.

type, known by such common names as "pea," "hedgehog," "spiny oak gall," being hard globular or elongated galls attached to the surface of the leaf, reticulate on the outside or rough with points or spines and containing one, two, or several larval chambers without an inner cell. The flies emerge late in the fall, usually before the

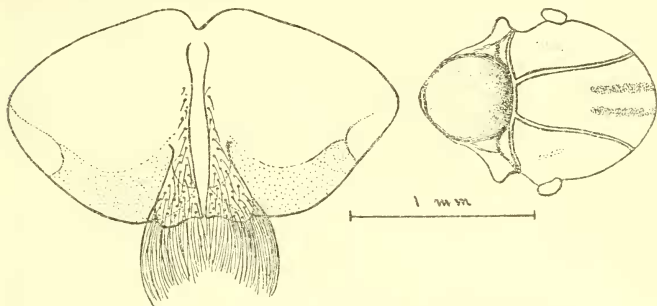


FIG. 2.—*PHILONIX GIGAS*, NEW SPECIES. HYPOPYGIUM AND MESONOTUM.

leaves drop (and in one known instance oviposit at once in the buds), the galls remaining attached to the leaves and dropping with them. The only *Philonix* galls known are of quite a different type. They are fleshy, globular, slightly attached to the under surface of the leaf, with a thick pithy wall covered with a short dense felt-like pubescence looking as though it had been rolled in road dust. Inside there is a

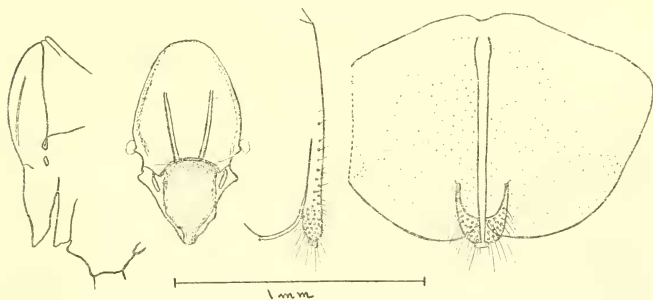


FIG. 3.—*ACRASPIA PEZOMACHOIDES* (OSTEN SACKEN). DORSAL AND SIDE VIEWS OF MESONOTUM AND HYPOPYGIUM.

single thin inner cell surrounded and supported by a dense layer of dark-brown radiating fibers. They drop to the ground in September and October long before the leaves, and some larvae transform into adults which emerge later the same season in November and December and others not until the next spring. Other larvae do not transform

until the second or third fall. Habits of oviposition unknown. The known species of both genera are found only on the white oaks. Tentative keys for the separation of the species in each genus are here presented together with descriptions of two new species.

SEPARATION OF PHILONIX AND ACRASPIS.

Both genera include only agamic females with rudimentary wings and a scutellum of normal length and size, the third segment of antenna always longer than the fourth.

Scutellum normally rounded behind. Ventral spine truncate, broadest at apex, nearly flat and armed with long bristles. Fig. 2-----**Philonix**.

Scutellum tapering to a point behind and hence triangular. Ventral spine short, stout, rounded behind and hairy; more slender and trough-shaped than normal. Fig. 3-----**Acraspis**.

KEY TO DESCRIBED SPECIES OF PHILONIX.

1. Fore wing not over 3.75 times as long as broad but reaching back beyond the second tergite and with typical venation outlined except for areolet. *Q. lyrata*-----**gigas**, new species.
Fore wing more lanceolate, at least four times as long as broad, not reaching to hind margin of second tergite, with only subcosta and first cross-vein distinct, radial cell seldom suggested-----2.
2. Interocular area square. Wing ratio less than 1.0 (wing length less than width of head), broadest behind middle and end rounded. 3.75 mm. New York. Gall unknown-----**nigricollis** Fitch.
Interocular area broader than high (ratio 1.1). Wing ratio at least 1.2-----3.
3. Dark-colored species, abdomen nearly black. Mesoscutum with a median polished and nearly bare spot. Eastern United States. *Q. alba*.
nigra (Gillette) (=gillettei Bassett).
Light-colored species, abdomen slightly infuscated. Pubescence on mesoscutum uniform, no polished bare spot-----4.
4. Hind tarsus longer than tibia. Under 3.75 mm. Gall unknown. New York.
fulvicollis Fitch.
Hind tarsus equal to tibia. 4.8 mm. *Q. bicolor*. Florida.
lanaeglobuli Ashmead.

PHILONIX GIGAS, new species.

Agamic female.—Head, legs, and thorax reddish-brown, more or less infuscated, and clothed except on frons with silvery pubescence; abdomen black, red at tip. Head coriaceous, broader than thorax, broadened behind eyes; interocular space 0.57 transfacial and area 1.2 times as broad as high; malar space 0.4 eye and without groove; antennae 14-segmented; lengths as 21:10:32:27:20:18:5:14:12:11:10:10:10:18. Mandibles 2-toothed; palpi 5 and 3 segmented. Mesoscutum broader than long, smooth with uniformly distributed setigerous punctures; parapsidal grooves narrow, deep, smooth, percurrent, almost straight, well separated behind; anterior and lateral lines represented only by infuscations. Scutellum disk circular, slightly rugose behind, arcuate furrow at base. Propodeum smooth except on rugose neck; usual carinae not developed. Mesopleurae smooth and pubescent. Hind leg with femur stouter than coxa;

tibia longer than tarsus, second shorter than fifth; claw with large tooth. Fore wing reduced, reaching beyond second tergite, about 3.5 times as long as broad; venation normal but without areolet; surface pubescent; margin ciliate. Abdomen smooth, polished, longer than head and thorax, longer than high, somewhat compressed; second tergite occupying 0.6 with large white pubescent areas reaching its hind margin on sides. Ventral spine truncate, broadest at apex, very hairy; ovipositor when dissected out a little longer than antenna. Using width of head as a base, the length of mesonotum ratio is 0.96; antenna, 2.5; ovipositor, 2.8; wing, 1.85.

Range in length of 19 pinned specimens, 2.8–4.9 mm.; average, 3.9 mm.

Closest to *lanaeoglobuli* Ashmead, a lighter colored species, whose wing does not reach middle of second tergite and whose venation is far less complete.

Type.—Cat. No. 24679, U.S.N.M. Type and 15 paratypes.

Host.—*Quercus lyrata*.

Gall.—Globular, 15–20 mm. in diameter, produced on the under side of leaves and dropping to the ground in the fall. In appearance and structure they resemble the much smaller galls of *Philonix nigra* (Gillette).

Habitat.—The type galls were collected at Hoxie, Arkansas. Seven flies emerged December 1, 1917; three December 18, 1917; and two March 24, 1919. From galls collected at Poplar Bluff, Missouri, three adults were cut out November 16, 1917.

KEY TO DESCRIBED SPECIES OF ACRASPID.

1. Sides of all the tergites pubescent, a narrow median dorsal stripe bare----2.
Pubescence on abdomen confined to usual patches on sides of second tergite or at most to second and third-----5.
2. Mesonotum at least as long as width of head (ratio 1.0). Hind tarsus shorter than tibia. Wing broadest in distal half-----3.
Mesonotum length 0.85–0.90 width of head. Hind tarsus as long or longer than tibia. Wing lanceolate not distinctly wider in distal half-----4.
3. Wing more than twice as long as scutellum, longer than width of head. Segment 3 of antenna not longer than 1 and 2. Lateral lines bare and shining. Colorado-----alaria, new species.
Wing less than twice scutellum, not as long as width of head. Segment 3 of antenna longer than 1 and 2. Mesoscutum uniformly pubescent, lateral lines not bare of shining-----villosa Gillette.
4. Mesoscutum length not over 0.9 width of head. Propodeum without a median carina. Pubescence between parapsides denser than on adjacent scutellum. Parapsidal grooves distinct but short. Disk rugose behind. *Q. macrocarpa*.
macrocarpa Bassett (=undulata Gillette).
Mesoscutum ratio over 0.9. Propodeum with a median carina. Pubescence between parapsides as sparse as in base of scutellum. Parapsidal grooves very fine and short. Disk coriaceous behind. Gall on chestnut oaks.
hirta (Bassett).

5. Hind tarsus shorter than tibia. Scutellum not over-hanging metanotum, its apical portion triangular in profile and slightly upturned. Mesoscutum with uniformly distributed short pubescence. *Q. prinoides*.
prinoides (Bentenmueller).
 Hind tarsus as long or longer than tibia. Scutellum overhanging metanotum, its apical portion not upturned but directed straight backward. Mesoscutum almost bare between parapsides behind.....6.
6. Parapsidal grooves precurrent. Wing at least twice as long as scutellum.
Q. bicolor, Florida.....*echini* Ashmead.
 Parapsidal grooves not quite reaching front margin. Wing not twice length of scutellum.....7.
7. Low median ridge from median ocellus to antennae. *Q. alba*.
erinacci Bentenmueller.
 Front without median ridge.....*pezomachoides* (Osten Sacken).

ACRASPID ALARIA, new species.

Agamic female.—Reddish-brown with clypeus to occiput; antennae, propodeum, abdomen except sides of second tergite deeply infuscated to black. Interocular space 0.58 transfacial and area 1.27 times as broad as high. Malar space, 0.47 eye. Antennae, 14-segmented; length as 18:9:24:21:16:14:12:11:9:9:8:8:7:14. Palpi 3 and 5 segmented; last very stout. Sides of propodeum finely rugose. Mesonotum 1.6 times as long as broad; mesoscutum as long as broad; the lateral lines bare and polished; parapsidal grooves very short, obliterated at both ends; pubescence more sparse between parapsides and surface often shining. Scutellum margined; not as sharply triangular behind as in some species. Propodeum rugose between the usual carinae. Hind coxa not as stout as femur; tarsus shorter than tibia. All claws with stout teeth. Fore wing broad; width one-third length, broadest in distal half, over twice as long as scutellum, reaching middle of second tergite; only subcosta and first abscissa of radius developed. Abdomen about 0.6 length of body; second tergite making up 0.6; lengths of tergites 2-4 as 82:23:6. Sides of all tergites pubescent, with narrow median dorsal base space, which is broader on second tergite and deeply indents the pubescent patches on its sides. Using width of head as a base the length of mesonotum ratio is 1.06; wing, 1.1; antenna, 2.5; ovipositor, 2.24. Range in size of 14 pinned specimens, 2.5-3.5 mm.; average 3.1 mm.

Type.—Cat. No. 24680, U.S.N.M. Twelve cotypes.

Host.—*Quercus gambelii*.

Gall.—Similar to that of *Acraspis villosa* Gillette. Straw-yellow; 9-11 mm. in diameter, covered with a large 1 mm. deep of closely packed conical projections, each ending in a bristle a little over 1 mm. long. Monothalamous, the central larval cell 3 mm. in diameter. Single, attached to midrib; exit hole close to point of attachment. Occurs in fall.

Type locality.—Colorado Springs, Colorado. Galls collected November 4, 1918, by Mr. J. H. Pollock and sent in under Hopkins U. S. No. 10773^x. One fly reared November 11, 1918, others found alive in cage January 15, 1919.

ANDRICUS CINNAMOMEUS Ashmead.

Andricus cinnamomeus ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, 1887, p. 137.

Andricus calycicola ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, 1887, p. 141.

A. calycicola was described as producing two types of galls on *Q. laurifolia*, one inside of buds and one in an aborted acorn cup. The type fly and gall as labeled by Ashmead and agreeing with his description are quite obviously the same as *cinnamomeus*, of which the United States National Museum has nine type flies and whose bud gall is produced on *Q. chapmani*. The writer has collected it at St. Petersburg, Daytona, and Ocala, Florida, and reared the fly which agrees with the types.

The acorn gall and fly belong to *Callirhytis*. The gall is one of those which develops by the side of young acorns and then drops to the ground. As there is only one fly, without a head, in the collection no attempt is here made to determine or describe it.

ANDRICUS FORMOSUS (Bassett).

Cynips formosa BASSETT, Proc. Ent. Soc. Phila., vol. 3, 1864, p. 679.

Cynips capsuala ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, 1885, Proc. p. 9.

C. formosa was described from Waterbury, Connecticut, as forming a very rare gall on *Q. rubra*. The United States National Museum has a type fly and gall from Bassett. *C. capsuala* was described from *Q. cinerea* and *Q. catesbaei* from Florida, and the museum has two type flies which agree with the type material of *formosa*.

The writer collected these galls on the ground at Jacksonville, Florida, April 4, 1914, under *Q. phellos*. When a few were opened the middle of the next November, both pupae and adults were found. Flies emerged in breeding cage by February 24, 1915, and more came out February 15, April 15, and May 6, 1916, taking two years to emerge. This gall seems to be produced on *Q. laurifolia*, also in Florida. The writer has found old galls under tree of *Q. imbricaria* at Poplar Bluff, Missouri; under *Q. texana* at Boerne, Texas; and fresh growing clusters of galls on *Q. coccinea* at Miller, Indiana; Fort Sheridan, Illinois; and East Falls Church, Virginia. It seems to be common in the south and rare in the north, where it occurs on other host oaks.

ANDRICUS FURNESSAE (Weld).

Callirhytis furnessae WELD Insect. Insit. Menst., vol. 1, 1913, pp. 132-3.

As the tarsal claw has a distinct tooth, this species should be transferred to the genus *Andricus*, following Dalla Torre and Kieffer instead of Ashmead.

ANDRICUS PETIOLICOLA (Bassett).

Cynips petiolicola BASSETT, Proc. Ent. Soc., Phila., vol. 2, 1863, p. 325.

Andricus quinqueseptum ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, 1885, p. 299.

Andricus cicatricula BASSETT, Trans. Amer. Ent. Soc., vol. 17, 1890, p. 80.

Andricus concolorans KINSEY, Bull. Amer. Mus. Nat. Hist., vol. 42, 1920, pp. 302-4, pl. 22, figs. 12-13.

The species *quinqueseptum* was described from "12 specimens bred in July," said to be males. Two specimens were found in the United States National Museum labeled as this species. No others have been seen in other museums. The one in the old "museum collection," labeled by Ashmead as the type, belongs to another genus, and the one in the Ashmead collection agrees with the description of the species, although it is a female, and this specimen was elected as the holotype in July, 1921. As the antennae are described as 14-segmented, it is probable that the use of the sign for "male" in the original description was a typographic error. This fly agrees with specimens of *petiolicola*, and the gall confirms the idea that they are the same species, although it is slightly different in shape and occurs on the post oak.

The writer studied the Bassett types of *cicatricula* in the Academy of Natural Sciences, Philadelphia, and found he was unable to distinguish them from the Bassett types of *petiolicola*, and the six type galls of *cicatricula* on *alba* are similar to those of *petiolicola* on *pinus*.

Dr. A. C. Kinsey recently studied the "type material of Bassett's *Andricus cicatriculus* in the American Museum of Natural History" and says that it "contains one female of *A. concolorans* and a number of specimens of an inquiline. The description of the adult *cicatriculus* agrees with the inquiline, to which the name must be applied; it would appear to be a *Ceroptres*." The writer examined this material in June, 1921, and supplemented this with a study of the type material of *cicatricula* in other museums. It was Bassett's custom to put in his pill boxes all the material bred, including parasites and inquilines, and from this box sendings were made (unmounted and unsorted) to his correspondents with the name of the species written on the cover and "types," if such was the case. An examination of all the available sources shows that in this case it consisted of four species as follows:

	(a)	(b)	(c)	(d)
American Museum Natural History.....	1 female.....	1 female, 2 males.....	1
Academy Natural Science, Philadelphia.....	1 male.....	56 females, 18 males.....	1	1
United States National Museum.....		5 females, 9 males.....		1
	2.....	91.....	2	2

Species (a) is a rare find congeneric with a species on which Ashmead founded the genus *Euceroptres*, a guest genus distinct in the writer's opinion from *Ceroptres*. It was not recognized by Doctor Kinsey. Bassett's description of *cicatricula* does not apply to this species.

Species (b) is Bassett's *cicatricula*, to which his description does apply. It is a true gall maker, with the pronotum "narrow" in middle. It vastly outnumbered all the others. Species (c) is determined by the writer as *Callirhytis tumifica* (Osten Sacken) from an accidentally included and unnoticed gall somewhat similar in shape on a red oak and yielding flies at about the same time. Bassett's description does not apply to this. This is presumably the "single (undescribed) female of the Bassett types" in the American Museum, and it was in the row the first specimen of which was labeled *concolorans*.

Species (d) is also a *Callirhytis*, but unknown to the writer, and he will not describe it. Bassett's description does not apply to this. It must have issued from another unnoticed gall.

Doctor Kinsey has transferred Bassett's *cicatricula*, which is a true gall maker, to the genus *Ceroptres*, where it does not belong. Then he has taken a large series of *cicatricula* from the Thompson collection, and under the mistaken impression that it matched the single female (c) in the American Museum has redescribed the species under the name of *concolorans*, which becomes a synonym of *cicatricula*. All type material of *concolorans* seen by writer consists of material from the Thompson collection only and agrees with types of *cicatricula*. The figures of the galls of *concolorans* on *alba* seem to be like the types of *cicatricula*. The conclusion is that we have here just one species which ranges throughout the eastern half of the United States and forms galls on several white oaks.

The writer has reared flies from galls on *Quercus michauxii* from Ocala, Florida, an oak not previously recorded as a host of this species.

ANDRICUS VERNUS (Bassett).

Amphibolips verna BASSETT, Trans. Amer. Ent. Soc., vol. 26, 1900, p. 321.

This species was described from a single specimen taken April 9 ovipositing in bud of *Q. ilicifolia*. It is an *Andricus*.

CALLIRHYTIS BADIA (Bassett).

Amphibolips badius BASSETT, Trans. Amer. Ent. Soc., vol. 26, 1900, p. 323.

Callirhytis coralloso WELD, Proc. U. S. Nat. Mus., vol. 59, 1921, p. 216, pl. 32, figs. 16, 17.

While studying the Bassett collection at Philadelphia in May, 1921, the writer suspected that the type of *Amphibolips badius* Bassett described from an unknown gall was the same as *Callirhytis coralloso*

Weld. Later Mr. S. A. Rohwer kindly took a type of *corallosa* to Philadelphia and made a direct comparison and confirmed this suspicion, so that the name of *badia* must now be applied to the flies and gall recently described as *corallosa*. This discovery adds the further information to the life history that the fly of this root-gall-forming species emerges in "early spring" and oviposits in the buds of thrifty white oak sprouts, but the alternating generation is at present unknown.

CALLIRHYTIS BIGNELLI (Dalla Torre).

Trisolonia punctata ASHMEAD, Proc. U. S. Nat. Mus., vol. 19, 1896, pp. 129-130.

Andricus bignelli DALLA TORRE in Wytsman Gen. Ins. Cynipidae, 1902, p. 61.

Amphibolips montana BEUTENMUELLER, Insect Insit. Menst., vol. 1, 1913, p. 122.

The type of *montana* is in the collection of William Beutenmueller, who also has another specimen of the same species loaned to the writer for study in June, 1921. This agrees with the Ashmead type of *punctata* which Dalla Torre renamed *bignelli*.

CALLIRHYTIS CONGREGATA (Ashmead).

Andricus congregatus ASHMEAD, Proc. U. S. Nat. Mus., vol. 19, 1896, p. 120.

The following notes are made from the seven type females in the United States National Museum. The four with unbroken antennae show 15 segments. The sides of pronotum are slightly reticulate; mesoscutum coriaceous, as long as broad, parapsidal grooves complete. Transverse groove at base of scutellum scarcely divided into distinct pits. Carinae on propodeum bent outward. Fore wing short brown pubescent; the hairs on hind margin slightly longer than those on surface, but much shorter than normal cilia. Venation complete; areolet distinct; cubitus reaching basal below middle. Claws weak and simple. Abdomen higher than long, shorter than head and thorax; ventral spine not longer than broad. Using width of head as a base, the length of the mesoscutum ratio is 1.22, antenna, 2.08; ovipositor, 5.25; wing, 3.2. It is a *Callirhytis* related to those other species of this genus bred from flower galls. In the collection there are also two males, which are undescribed.

Male.—Similar to female in color and sculpture. Antennae 16-segmented, wings normally ciliate; abdomen triangular, shorter than thorax. Length 1.7-1.8 mm.

The writer has collected galls of this species at Los Angeles, Pasadena, Santa Anita, Camp Baldy, Newhall, Piru, in Ojai Valley, Carpinteria, Montecito, Santa Barbara, Santa Margarita, Paso Robles, Soledad, Monterey, Los Gatos, Palo Alto, Mount Tamalpais, back of Berkley, at Bagby, and St. Helena, California. They do not

occur on *Q. chrysolepis*, as Ashmead stated, but on *Q. wislizeni* and *Q. agrifolia*. *Q. chrysolepis*, and *Q. agrifolia* have no galls in common; *wislizeni* and *agrifolia* have many. The new galls start in early April and are full grown by early May. While growing rapidly they secrete honey-dew.

CALLIRHYTIS CRYPTICA, new species.

Female.—Dark reddish-brown. Head coriaceous. Interocular space, 0.5 transfacial, and area 1.25 times as broad as high. Malar space, 0.5 eye, with striae. Antennae slender, 13-segmented; lengths as (pedicel) 13:6:11:12:11:11:10:9:8:7:7:7:14. Sides of pronotum coriaceous. Mesoscutum broader than long; coriaceous. parapsidal grooves deep and complete, median reaching forward nearly half-way. Scutellum coriaceous; usual pits oval, smooth, very oblique, separated by a septum wider than a pit. Median area on metanotum as broad as the area on propodeum between the carinae, these carinae nearly parallel inclosing a smooth area broader than long. Veins of fore wings obliterated beyond second cross-vein, others pale; no areolet; surface short pubescent; margin not ciliate. Hind tarsus as long as tibia; claws simple. Abdomen shorter than head and thorax, broader than long in side view, with interrupted ring of wool at base, only tergites 2 and 3 showing dorsally; ventral valves not conspicuous; ventral spine very long and slender, twice as long as hind matatarsus; this character hard to see in pinned specimen. Ovipositor hooked at end. Using width of head as a base, the length of mesonotum ratio is 1.09; antenna, 2.6; ovipositor, 4.0; wing, 3.5.

Range in length of eight specimens, 1.9–2.1 mm., average 2 mm.

Type.—Cat. No. 24725, U.S.N.M. Type and six paratypes.

Host.—*Quercus falcata* and *Quercus myrtifolia*.

Gall.—A bud gall found in October. The affected bud in terminal cluster becomes enlarged, leaf rudiments are protruded beyond the bud scales, and then the whole thing turns brown, although one or two green leaves sometimes grow out of this seemingly dead bud. Completely hidden within is an axial, conical, thin-walled cell with a tuft of hairs near apex, filling the whole interior of bud. It somewhat resembles the gall of *Andricus cinnamomeus* Ashmead, which is also within a swollen bud but on *Q. chapmani*. Its covering of bud scales is intact, and within is a central cavity, on one wall of which is the larval cell, which is therefore eccentric instead of axial.

Habitat.—The type galls were collected at Dothan, Alabama, on *Q. falcata*, October 8, 1919. Flies issued May 1 and May 23, 1920. These galls were seen also at Cottondale, Florida. At Carrabelle and at Ocala, Florida, they were collected on *Q. myrtifolia* and one fly

found dead in the cage the next May. The species pupates in December, the adults remaining in the galls until the next spring.

CALLIRHYTIS FLORA, new species.

Female.—Reddish-brown; abdomen nearly black posteriorly. Head coriaceous. Interocular space 0.58 transfacial and area 1.3 times as broad as high. Malar space 0.5 eye, with groove. Antennae slender, 14-segmented, lengths as (pedicel) 13:5:12:10:9:8:7:6:6:6:6:6:10. Sides of pronotum rugose. Mesoscutum broader than long; slightly rugose behind between parapsides; parapsidal grooves complete. Scutellum coarsely rugose, not margined, with two indistinct rugose pits at base. Carinae on propodeum bent slightly outward; spiracular areas smooth. Fore wing with normal brown venation; both cross veins clouded and areolet reaching about one-sixth way to basal; surface short brown pubescent; margin not ciliate. Hind tarsus shorter than tibia; tarsal claws weak, simple. Abdomen shorter than head and thorax, as broad as long; all tergites visible on dorsal margin; ventral valves almost vertical; ventral spine scarcely as long as broad; ovipositor exerted. Using width of head as a base, the length of mesonotum ratio is 1.1; antenna, 1.2; wing, 3.2; ovipositor, 9.3.

Range in length of 10 specimens, 1.5–2.3 mm.; average, 2 mm.

Type.—Cat. No. 24726, U.S.N.M. Type and seven paratypes.

Host.—*Quercus wislizeni*.

Gall.—An abrupt smooth and polished swelling of the midrib on the under side at the base of the leaf blade and rarely extending half the length of the leaf, 10–30 mm. long by 6–9 mm. in diameter; polythalamous, hard.

Habitat.—The type locality is Mount Tamalpais, Marin County, California, where galls were collected May 25, 1918. Galls were also collected at Camp Baldy June 15. In both cases flies issued and died in the packets before August 14. The galls were seen also at Bagby, Los Gatos, and Santa Margarita. The new galls start to develop in April and are full grown in about a month. A similar gall occurs on *Q. agrifolia*, and when reared it will probably prove to be caused by this species.

CALLIRHYTIS GEMMARIA (Ashmead).

This species, described from Florida, has been reported in the literature from New Jersey and Ontario. The writer has seen the galls in Florida at Jacksonville, Gainesville, Marianna, River Junction, Carrabelle, Madison, St. Petersburg, Clearwater, Miami, Daytona, and Green Cove Springs; in Maryland on Plummer Island; in District of Columbia; in Virginia at Falls Church and Bluemont;

on Blue Hill, Massachusetts; at Miller, Indiana; in Illinois at Evanston, Fort Sheridan, and Palos Park; at Ironton, Missouri; and at Palestine, Boerne, Austin, and Kerrville, Texas. They occur on *Quercus rubra*, *coccinea*, *falcata*, *ilicifolia*, *myrtifolia*, *pumila*, *cate-sbaei*, and *texana*, besides the oak from which it was described, *brevifolia*.

The young galls may be found forming from late May to early June, secreting honeydew from a gland at apex and at this stage containing a thick translucent nutritive layer inside, with a scarcely discernible larval cavity in center. On June 16, 1917, a cluster of developing galls was found at Fort Sheridan on *rubra* and watched at intervals during the summer. When visited a month later many of the galls were found to be plump and green, with a nipple at apex and many cells inside and they continued to enlarge and finally become woody and covered on outside with normal brown bark and remained on the tree all winter. They became the characteristic galls known in literature as *Andricus davisii* Beutenmueller, and from them only guest flies are reared. The types of *davisii* seen by the writer in six different collections are all guest flies of the genus *Synergus*. When attacked by inquillines the galls, instead of dropping to the ground, keep on growing and remain on tree.

In the Bulletin of the American Museum of Natural History (vol. 42, 1920, p. 295), Doctor Kinsey, working with museum specimens only without field observations on the growing galls, recognizes that the characteristic galls of *davisii* yield only a *Synergus*, but he is in error in thinking that they are derived from *Callirhytis punctata* (Bassett). In favorable specimens one can often find on the summit of the *davisii* galls a trace of the nipple and ribbed surface of the normal *gemmaria* gall. In a footnote he admits the possibility of his error, but does not say from what they are derived.

True parasites by killing the maker may stunt the growth of a gall and cause a characteristic appearance, and guest flies may also modify it. Cecidologists when describing galls should be sure they are describing a normal structure, and one can not always be sure of this from single specimens. They may be sure it is normal if they rear the maker, or, failing in this, find the gall in numbers and especially season after season.

CALLIRHYTIS MEDULLAE (Ashmead).

Cynips medullae ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, 1885, Proc., p. 8.

The two type females in the United States National Museum have the head not distinctly broader than thorax and simple claws and they belong in *Callirhytis*. As the fore wings have very short pubescence, the margin without cilia, and the venation pale, the species

is related to those species of the genus which are bred from flower galls and from stone galls in acorns.

CALLIRHYTIS MODESTA (Osten Sacken).

Cynips modesta OSTEN SACKEN, Proc. Ent. Soc. Phila., vol. 1, 1861, pp. 65-6.

Cynips papula BASSETT, Canad. Ent., vol. 13, 1881, p. 107.

C. modesta was described from three females from an irregular hard protuberance on both sides of leaf of red oak, the flies emerging in late June at Washington, District of Columbia. In the Museum of Comparative Zoology the type flies are gone from the pins, and the type gall looks like a fragment of the gall of *papula* Bassett, whose types the writer has seen at Philadelphia.

C. papula was described from a few females from a similar gall on red and black oak, the flies beginning to emerge July 12 in Connecticut. The only material of the adults of *papula* available for comparative study has been a fly reared by the writer from the characteristic gall on the leaves of red oak at Medina, New York (the gall contained pupae on July 2), and flies determined by Gillette from Iowa. The writer has seen the old galls at Rosslyn, Virginia, and at Hugo, Oklahoma, and taken the fresh galls many times in the Chicago area, where they were very common in 1917 and contained pupae on July 16. Thus the structure of the gall, the host oak, and the known facts of the biology correspond closely, for one would expect the flies to emerge two weeks earlier at Washington, and it seems probable that *modesta* and *papula* are but two names for one species.

If the material studied has been correctly determined, as seems probable, the species has nonciliate fore wings, claws simple, second tergite not tongue-shaped, and a very long ovipositor over 12 times the width of head. It is closely related to the flies reared from flower and acorn stone galls in the genus *Callirhytis*.

CALLIRHYTIS MYRTIFOLIAE (Beutenmueller).

Andricus myrtifoliae BEUTENMUELLER, Canad. Ent., vol. 49, 1917, p. 346.

This species has tarsal claws simple and belongs in the genus *Callirhytis* along with most species reared from flower galls. Using a cotype female for balsam mount, the length of mesonotum ratio is 1.22; antenna, 2.27; ovipositor, 1.9; wing, 3.25. It is one of a group of species with the ovipositor very short as compared with those species of flower gall flies known to oviposit in acorns.

CALLIRHYTIS OBTUSILOBAE (Bassett).

Andricus obtusilobae BASSETT, Trans. Amer. Ent. Soc., vol. 26, 1900, p. 316.

Described from two females from an unknown gall. The type fly in Philadelphia is a *Callirhytis*, with nonciliate fore wings and pale venation, and is related to those species bred from flower galls.

CALLIRHYTIS PARVA, new species.

Female.—Reddish-brown. antennae and tarsi yellowish. Head, sides of pronotum, and mesoscutum coarsely coriaceous in balsam, but looking almost punctate or rugose under binocular. Scutellum rugose, with well-separated smooth pits at base. Malar space half eye. Antennae, 12-segmented; 1 and 3 subequal, last equal to two preceding. Parapsidal grooves complete; median a mere notch. Wings hyaline; venation obliterated beyond second cross vein; surface short pubescent; margin not ciliate; no areolet. Hind tarsus shorter than tibia; tarsal claws simple. Abdomen equal to head and thorax, nearly as broad as long; pubescent patches at base inconspicuous—no woolly ring; all tergites visible along dorsal margin; ventral valves turned up into nearly vertical position, and conspicuous, ventral spine about four times as long as broad. Using width of head as a base, the length of mesonotum ratio is 1.08; antenna, 2.3; ovipositor, 5.0; wing, 3.2.

Range in size, 1.5–2.2 mm.; average, 2 mm.

Male.—Body nearly black; antennae yellow, 14-segmented, flagellum tapering toward tip; all its segments stout and barrel-shaped. Fore wing margin ciliate. Abdomen shorter than thorax.

Range in size, 1.4–1.7 mm.; average, 1.6 mm.

Described from 20 female and 6 male specimens.

Type.—Cat. No. 24727, U.S.N.M. Type female, allotype and 12 female paratypes.

Host.—*Quercus imbricaria*.

Gall.—On the staminate flowers dropping to the ground about the middle of May. Somewhat globular, greenish-white, covered with coarse sprawling pubescence, 3–4 mm. in diameter, single or in clusters. Fleshy at surface, but harder inside; usually two-celled.

Type locality.—Rosslyn, Virginia, near old fortifications on Leesburg pike above Chain Bridge. Collected May 16, 1920, and flies cut out of galls June 11. The United States National Museum has a similar gall from Cadet, Missouri, collected by J. G. Barlow, May 3, 1895.

CALLIRHYTIS POMIFORMIS (Bassett).

Cynips pomiformis BASSETT, Canad. Ent., vol. 13, 1881, p. 74.

Callirhytis maculipennis KIEFFER, Bull. Hist. Nat. Metz, ser. 2, vol. 11, 1904, p. 131.

C. maculipennis was described from material sent by C. F. Baker from Claremont, California, from *Q. agrifolia*, and the types were returned to Baker. The writer has seen the type galls and flies at Pomona College and galls at Stanford University from Baker. It seems to be a synonym of *pomiformis*, and the Pomona material is labeled in Baker's hand "Callirhytis maculipennis Kiefer = Andri-

cus pomiformis Bassett," showing that before Baker left Pomona he recognized that they were the same.

CALLIRHYTIS QUERCUS-PHELLOS (Osten Sacken).

Cynips quercus-phellos OSTEN SACKEN, Proc. Ent. Soc. Phila., vol. 1, 1861, p. 70.

Cynips similis BASSETT, Proc. Ent. Soc. Phila., vol. 4, 1865, pp. 346, 350, 379.

C. quercus-phellos was described from four specimens, reared June 29, from Virginia side of Potomac near Washington, the types being deposited in the Museum of Comparative Zoology, from which the United States National Museum obtained a paratype by exchange.

The United States National Museum has a cotype fly and gall of Bassett's *similis*, a gift from the American Museum, which cannot be separated from the above, although the galls of *similis* are on *Q. ilicifolia* instead of on *Q. phellos*, hence *similis* becomes a synonym of the older name.

The writer has seen what seems to be the same gall on *Q. falcata*, *brevifolia*, *texana*, *laurifolia*, and *myrtifolia*, but has never reared adults.

CALLIRHYTIS TURNERII (Ashmead).

Cynips turnerii ASHMEAD, Trans. Amer. Ent. Soc., vol. 9, 1881, Proc. p. 16.

Andricus topiarius ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, 1887, p. 136.

C. turnerii was described from three females bred from a woolly flower gall on water oak, *Q. nigra*. The types are in the United States National Museum, as well as other females and males determined by Ashmead, also from Jacksonville, Florida. Mayr correctly transferred it to *Callirhytis* in 1902, and with its uniform light yellowish-brown color, pale venation, and nonciliate front wings in female, the species belongs in that section of the genus which includes most of the flower galls and the acorn stone galls.

A. topiarius was described from two females, one of which is in the National Museum, the other in Philadelphia. The writer is unable to separate the type from *turnerii*. It was, however, described from a bud gall on post oak, but there would seem to be some mistake here. The type galls are of the same general type as those of *stropus* Ashmead, *foliatus* Ashmead, *flavohirtus* Beutenmueller, all of which are on white oaks and give flies which go in the genus *Andricus*. The type of *topiarius* is closely related to those species of *Callirhytis* which are reared from galls on red oaks. It seems probable that Ashmead has associated the two flies reared with the wrong gall and that it will make for progress to call *topiarius* a synonym of *turnerii*.

AMPHIBOLIPS TRIZONATA Ashmead.

The gall of this species was said to be "in the blossoms of an oak," but no description was given and the host oak unknown. The type

galls in the United States National Museum bear the same U.S.D.A. number as the flies, 2668, and are from Port Grant, Arizona. They are very characteristic, and the writer has taken them many times.

Host.—*Quercus emoryi* and *Quercus hypoleuca*.

Gall.—Globular, 25–40 mm. in diameter; green, turning to a tan later; smooth or with a finely coriaceous surface. Interior of a dense cellular structure lighter in color than surface, but darker toward the nonseparable larval cell in center. From the attachment a number of whitish strands run up through the cellular tissue to the larval cell. Attached singly to side of small twigs, not a flower gall.

Habitat.—The writer has collected these galls at Prescott, Oracle, Nogales, Patagonia, Huachuca Mountains in Ramsey Canyon, and in the Mule Pass Mountains near Bisbee, Arizona. At Hanover Junction, New Mexico, on July 16, 1918, *emoryi* trees were seen bearing hundreds of these galls and looking like apple trees full of fruit. Some were full grown and still green, while others showed all stages in the process of turning from green to tan, and these contained early and late pupal stages or adults and a few had already begun to emerge. Some of the last season's old and weather galls still hung on the trees. The museum has galls from Chiracahua Mountains also.

The gall of *Amphibolips palmeri* Bassett is of the same type but larger, being 65 mm. in diameter and from an unknown Mexican oak. The flies of *palmeri* and *trizonata* differ from all the other species of *Amphibolips* in having transversely banded wings. Mr. S. A. Rohwer has been kind enough to take a type of *trizonata* to Philadelphia and compare it with the type of *palmeri* for me. The two species may be separated as follows: In *palmeri* the apical and stigmatic clouds of wing are confluent on hind margin and first cubital cell is dusky, second tergite closely punctured, scutellum more coarsely sculptured than mesoscutum, antennae 13-segmented, the apical much shorter than 11 plus 12; in *trizonata* the apical and stigmatic clouds are separate and distinct, first cubital cell not clouded, second tergite only sparsely punctured, little difference in sculpture of mesoscutum and scutellum, antennae 12-jointed, apical longer than two preceding.

BASSETTIA CEROPTEROIDES (Bassett).

Callirhytis ceropteroides BASSETT, Trans. Amer. Ent. Soc., vol. 26, 1900, p. 324.

The types of this species have a massive head much broader than the thorax; no malar groove; segment 3 of antenna longer than 4 in ratio of 13:10; mesoscutum coarsely coriaceous; parapsidal grooves obliterated in front; pits of scutellum small; fore wing not ciliate on margin; only subcosta and the two cross-veins visible; woolly ring at base of second tergite; ventral spine at least five times as long as broad. The species belongs in *Bassettia*.

BASSETTIA CORRUGIS (Bassett).

Holcaspis (?) *corrugis* BASSETT, Trans. Amer. Ent. Soc., vol. 14, 1887, p. 131.

From an unknown gall. Taken ovipositing in spring in buds of *Quercus prinoides*. As the head is broader than thorax, massive, the antennae not moniliform, the third segment longer than the fourth, last not twice preceding, the second tergite with an interrupted ring of hairs at base, pits of scutellum narrow, oblique, malar space less than half eye, and ventral spine five times as long as broad, the species is here transferred to *Bassettia*.

SYNERGUS CITRIFORMIS (Ashmead).

Ceroptres citriformis ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, 1885, p. 300.

The types of this species belong to the genus *Synergus*.

SYNERGUS OBTUSILOBAE (Ashmead).

Ceroptres obtusilobae ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, 1885, p. 300.

The types of this species belong in genus *Synergus*.

SYNERGUS POMIFORMIS (Ashmead).

Ceroptres pomiformis ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, 1885, p. 300.

The one type fly of this species in the United States National Museum is a female, not a male, and is a *Synergus*. The Museum of Comparative Zoology has a male sent to A. P. Morse and labeled in Ashmead's hand "*Synergus pomiformis* Ashm. W. H. Ashmead, donor, 1895."

SYNERGUS SUCCINIPEDIS (Ashmead).

Ceroptres succinipedis ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, 1885, p. 300.

The types of this species belong in *Synergus*.

SYNERGUS VIRENTIS (Ashmead).

Ceroptres virentis ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, 1885, p. 300.

The three types in the United States National Museum and one in the Academy of Natural Sciences, Philadelphia, are all *Synergus*.

ANTISTROPHUS LIGODESMIAE-PISUM (Walsh).

Beutenmueller has very justly recognized that *Asclepiadiphila stephanotidis* Ashmead is but another name for this species. By a curious error Ashmead described these galls as occurring on *Stephanotis*, an introduced greenhouse climber belonging to the milkweed family and not found wild in this country and certainly not escaped

from greenhouse at Oregon, Missouri, over 30 years ago. The label on the type galls plainly says *Stephanomeria*, which is a composite close to *Lygodesmia* distinguished by its pink flowers and plumose pappus and perhaps not separable from it on September 17, when the galls were collected and from the material sent in. Both have filiform naked branches, milky juice, and alternate leaves. Only one species of *Stephanomeria* would be at all likely to occur in that locality, and the genus is entirely omitted in the seventh edition of Gray, which does include that area, so there is strong probability that the host was misdetermined and that the *stephanotidis* galls were on *Lygodesmia*. At any rate, if it does attack the closely related genus *Stephanomeria*, no one has found it on it since. As *stephanotidis* is the genotype of the genus *Asclepiadiphila* Ashmead, *Antistrophus* Walsh and *Asclepiadiphila* Ashmead are isogenotypic through synonymy.

Dalla Torre and Kieffer have erroneously recognized the species *stephanotidis* and made *Asclepiadiphila* a synonym of *Aylax* instead of *Antistrophus*.